

### **REMARKS**

This responds to the Office Action mailed on December 12, 2005.

No claims are amended. Claims 1-38 are now pending in this application.

#### **§102 Rejection of the Claims**

Claims 1-38 were rejected under 35 U.S.C. § 102(b) as being anticipated by Lehoczky et al. (“Scheduling periodic and aperiodic tasks using the slack stealing algorithm”). This rejection is respectfully traversed, as the reference does not show each and every element of the invention as claimed. In addition, a proper prima facie case of anticipation has not been established because the Examiner has not identified where at least one claim limitation is taught in the reference. Further, Applicant has not been able to find teaching of the claim language in the reference. The finality of the Office Action is also traversed, as a proper rejection has not been made.

The Office Action repeats the previous rejection, and provides a Response to Arguments section that states that “applicant does not state specific limitations that are not met by cited references.” This statement is respectfully traversed. The Examiner’s attention is directed to the following quote from the last response, which clearly identifies claim language that is not met by the cited references: “Each of the independent claims contain elements referencing activation and inactivation of tasks. The Office Action does not indicate where the reference describes this aspect of the claims, and a review by Applicant fails to find any mention of such activation and deactivation of tasks.” It is difficult to prove that a reference does not describe something, other than by indicated what it does teach. This is why the burden is on the Examiner to establish a prima facie case of anticipation by identifying where the reference describes each claim element.

The element in question in claim 1 is: “determining available slack for tasks at each priority level, **taking into account tasks that are activating and inactivating;**”. The Office Action recites the first part of the element (not the part in bold) and provides citations to the reference where such first part is allegedly described: “determining available slack for tasks at each priority level (page 178, section 8.3; table 8.2; page 179, section 8.3.1 lines 25-40; page

183, section 8.3.2 lines 37-40);” These citations have been reviewed in detail, and do not disclose the bold part of the claim language.

Applicant now describes what each of these sections of the reference describes, and why it does not describe the claim language in bold above.

page 178, section 8.3; table 8.2: This language describes the precomputation of slack values and stores them in table 8.2. There is no discussion of activation and inactivation of tasks. In fact, by precomputing values, it appears than an assumption is made that the tasks will not inactivate.

page 179, section 8.3.1 lines 25-40: This language describes a work function to give the completion time of required work. There is no discussion of activation and inactivation of tasks. The words or concepts related to activation and inactivation are not found in this cited text.

page 183, section 8.3.2 lines 37-40): This language describes the need to schedule a hard aperiodic when it arrives at an empty aperiodic queue. There is no discussion of activation and inactivation of tasks. The words or concepts related to activation and inactivation are not found in this cited text.

The previous response is repeated below. It should be noted that the response clearly points out claim language that is not taught or suggested by the reference. In fact, the reference specifically ignores the claimed aspects of activation and inactivation of tasks. As previously pointed out, slack stealing is a very complicated task. By ignoring the activation and inactivation of tasks, Lehoczhy et al., is able to focus on scheduling periodic and aperiodic tasks. Adding in activation and inactivation would add complexities that Lehoczhy et al., was not prepared to address.

The rejection does not identify where the reference describes “taking into account tasks that are activating and inactivating” as recited in claim 1. Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ 2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP § 2131. To establish a prima facie case of anticipation, each element must be shown in

complete detail in the reference. Since the above claim language is lacking, a proper prima facie case of anticipation has not been established and the rejection should be withdrawn.

Language from previous response:

The work of Lehoczhy et al. was referenced in the background section of the present application. It is characterized as being “limited to only a static set of execution threads, i.e. a fixed set of recurring tasks without any new periodic tasks being activated and without any periodic tasks being deactivated. However, actual real-time processing environments typically contain a dynamic set of threads, as certain periodic tasks become active and others become inactive.”

Each of the independent claims contain elements referencing activation and inactivation of tasks. The Office Action does not indicate where the references describe this aspect of the claims, and a review by Applicant fails to find any mention of such activation and deactivation of tasks. Since at least one element of the claimed invention is lacking in the reference, a proper prima facie case of anticipation has not been established and the rejection should be withdrawn. The dependent claims distinguish the reference for at least the same reasons.

Claim 1 includes: “determining available slack for tasks at each priority level, taking into account tasks that are activating and inactivating;”.

Claim 10 includes: “determining available slack for tasks at each priority level, taking into account tasks that are activating and inactivating;”.

Claim 20 includes: “determining available slack for tasks, taking into account tasks that are activating and inactivating;”.

Claim 21 includes: “a first module that is to determine available slack, taking into account aperiodic tasks that are requesting activation and deactivation at unpredictable times; and”.

Claim 29 recites: “determining available slack for processes at each priority level, taking into account processes that are activating and inactivating; and”.

As can be seen, each independent and thus each dependent claim includes references to activation and deactivation. No such discussion is found in the reference, and in fact, the background of the application specifically refers to the work by the author of the cited reference as not dealing with activation and deactivation. As such, the rejection should be withdrawn.

§103 Rejection of the Claims

Claims 1-38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Biliris et al. (6,041,354)(hereinafter Biliris) in view of Turner et al. (6,505,229) (hereinafter Turner). This rejection is respectfully traversed. The references, alone or combined do not teach or suggest each and every element of the claimed invention, as the claimed “harmonic tasks” is not disclosed. Further, the combination of references is believed improper, as a proper suggestion to combine has not been established, and the success of any such combination is in doubt, at least due to the inherent complexities of slack stealing.

The Office Action repeats the previous rejection, and provides a Response to Arguments section that states that “applicant does not state specific limitations that are not met by cited references.” This statement is respectfully traversed. The Examiner’s attention is directed to the following quote from the last response, which clearly identifies claim language that is not met by the cited references: “There is no description in either reference, alone or combined, of how to determine slack, taking into account tasks that are activating and inactivating as claimed in each of the independent claims. Turner et al., is cited as providing teaching of activating and inactivating tasks. However, it does not describe any method of determining slack in the context of such activating and inactivating tasks. Biliris et al., does not address activating and inactivating tasks. Thus, the references, alone or combined, do not teach or suggest a claimed element. As such, the rejection should be withdrawn.”

The prior Response clearly points to claim language that is not taught or suggested by the references, either alone or combined.

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To do that the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.*

The *Fine* court stated that:

Obviousness is tested by "what the combined teaching of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d

413, 425, 208 USPQ 871, 878 (CCPA 1981)). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so." *Id.* (emphasis in original).

The M.P.E.P. adopts this line of reasoning, stating that

In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second, there must be a reasonable expectation of success.** Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)). (emphasis added)

An invention can be obvious even though the suggestion to combine prior art teachings is not found in a specific reference. *In re Oetiker*, 24 USPQ2d 1443 (Fed. Cir. 1992). At the same time, however, although it is not necessary that the cited references or prior art specifically suggest making the combination, there must be some teaching somewhere which provides the suggestion or motivation to combine prior art teachings and applies that combination to solve the same or similar problem which the claimed invention addresses. One of ordinary skill in the art will be presumed to know of any such teaching. (See, e.g., *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988) and *In re Wood*, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (CCPA 1979)).

There is no description in either reference, alone or combined, of how to determine slack, taking into account tasks that are activating and inactivating **as claimed in each of the independent claims.** Turner et al., is cited as providing teaching of activating and inactivating tasks. However, it does not describe any method of determining slack in the context of such activating and inactivating tasks. Biliris et al., determines slack, but does not address activating and inactivating tasks. As mentioned above, algorithms that determine slack are very complex. It is not a simple matter to add in concepts from a reference that does not even deal with slack,

such as Turner et al. Thus, the references, alone or combined, lack teaching or a suggestion of a claimed element in the context of slack stealing. As such, the rejection should be withdrawn.

Regarding claim 1, the Office Action indicates that real-time harmonic and dynamic tasks are shown in Biliris et al. at Col. 8, lines 13-19 and Col. 3, lines 40-47. While the words, “real time” are used at such lines, there appears to be no concept of harmonic tasks.

The Office Action also indicates that Biliris et al. describes determining available slack for tasks at each priority level in Col. 10, lines 40-48, Col. 11 lines 55-65 and Col. 13, lines 10-17. It does not appear the Biliris et al describes levels of priority, but rather, as seen at Col. 11, lines 64-65, describes checking admission for the highest priority job J’ in the disk’s wait queue. Thus, it appears that each job is assigned a priority, and there are not “levels” of priority. No discussion of levels of priority was found in other referenced sections of Biliris et al.

The Office Action indicates that Biliris et al. does not describe determining taking into account that a task is inactivating. However, Turner et al., is referenced as providing such teaching at col. 4, lines 1-6 and col. 8, lines 34-45. Turner et al., while referencing task or thread activation and deactivation does so in the context of a simple resource allocation scheme. It deals with none of the complexities of slack determination and allocation. Even if one were to find a suggestion to combine it with Biliris et al., **there is no likelihood of success in making the combination**. Slack allocation in the context of the presently claimed invention is a very complex endeavor. One cannot simply pick and choose elements from references and indicate that it would be obvious to combine them. The Office Action simply states that it would be obvious to combine the references “to ensure that a task can be activated or deactivated at anytime. By being able to activated or deactivated a task the user can determine and use excess slack thus making the entire system more efficient.” Nothing in this language hints at how to make the combination. Given the complexity of slack stealing algorithms, **no reasonable expectation of success has been established**, and hence, a proper prima facie case of anticipation has not been established. The rejection should be withdrawn.

Further, the purported suggestion does not originate from the prior art, as is required for a proper suggestion. It is simply an unsupported assertion of a benefit that can only be seen by using the present application as a roadmap. Further, it does not address the likelihood of succeeding in making the combination.

Any one of the above distinctions are sufficient for establishing that a proper prima facie case of obviousness has not been established. As such, it is respectfully requested that the rejection of claims 1-38 be withdrawn.

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 373-6972 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.


Respectfully submitted,

PAMELA A. BINNS

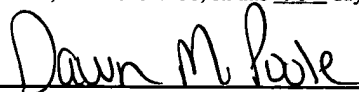
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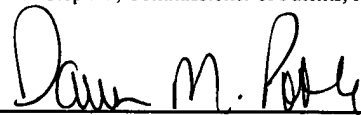
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**CERTIFICATE UNDER 37 CFR 1.8:** The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 10<sup>th</sup> day of February, 2006.



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